[redacted] Cat Hatch

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AL 48 0800 25834

"SAFUS Presentation to NSC
25 August 1960"

[redacted]

# SAMOS

## NATIONAL SATELLITE RECONNAISSANCE SYSTEM

### PHOTOGRAPHIC
### ELECTRONIC

REQMTS PROVIDED BY:
UNITED STATES INTELLIGENCE BOARD
-SATELLITE INTELLIGENCE REQMTS COMMITTEE

DEVELOPMENT AGENCY
UNITED STATES AIR FORCE

[redacted]

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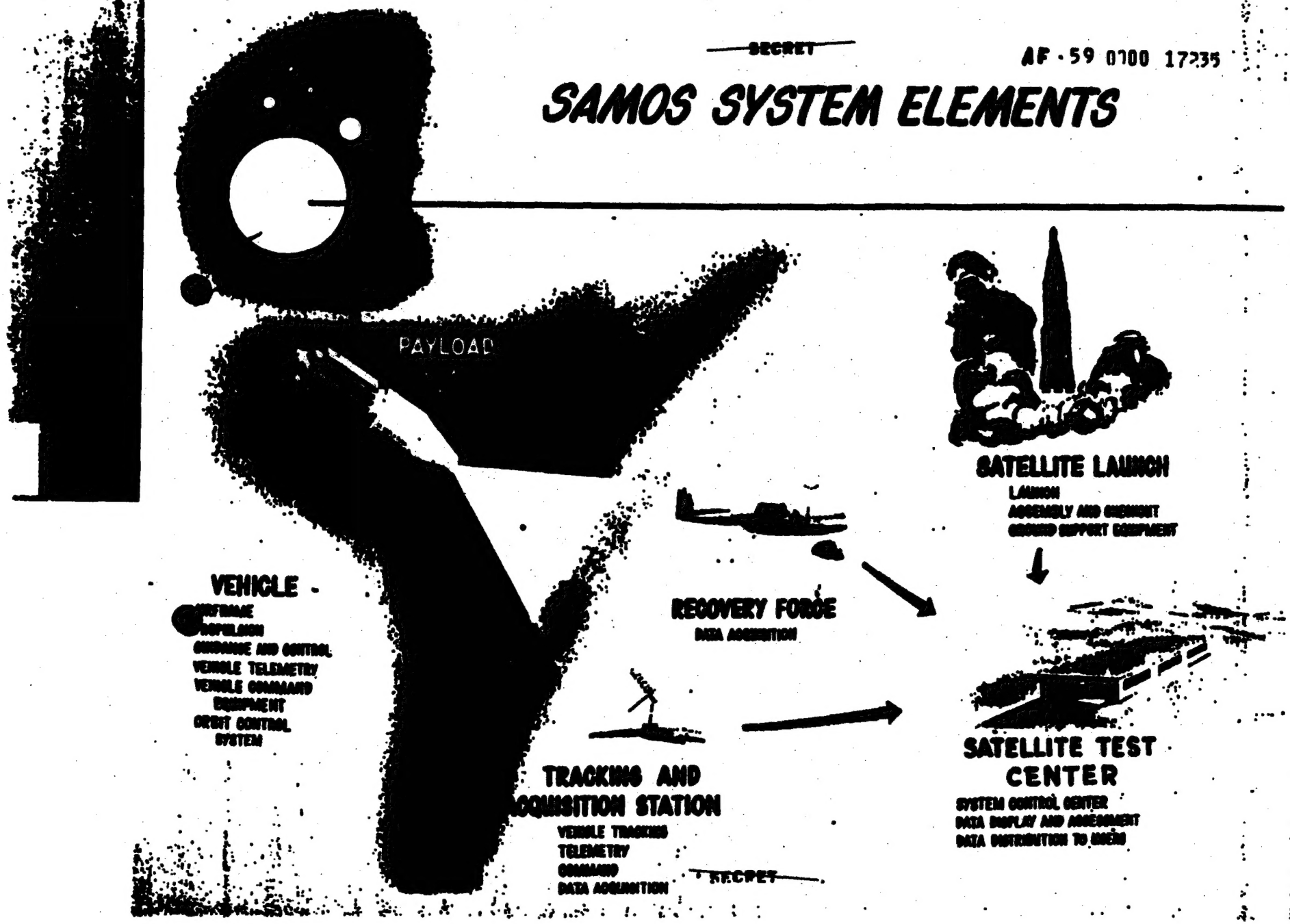
AF-59 0100 17235

# SAMOS SYSTEM ELEMENTS

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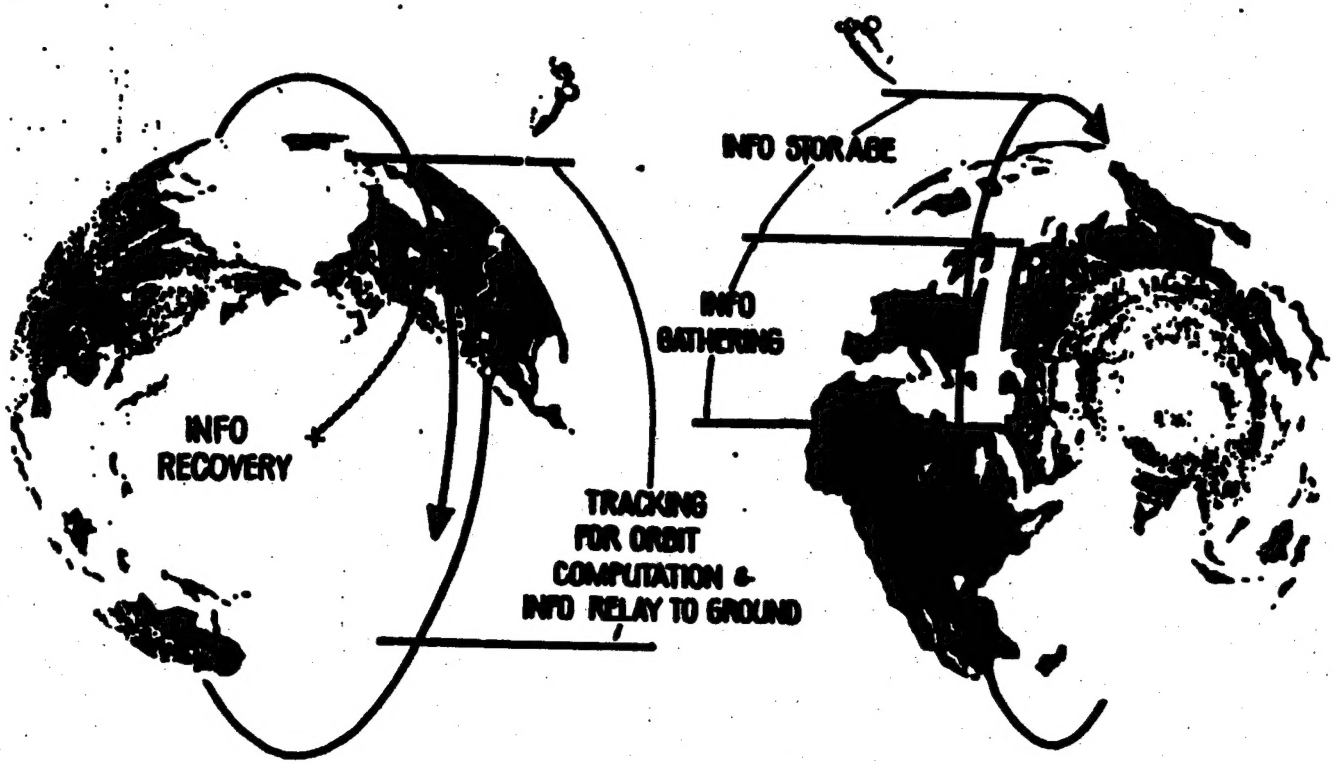
# SAMOS CONCEPT

## 150-300 S.MI. ALTITUDE - PHOTO & ELECTRONIC

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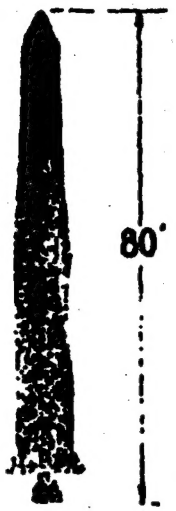
# TYPICAL SIZE AND WEIGHT




THOR
AGENA B

ATLAS
AGENA B

| | | | | | |
|---|---|---|---|---|---|
| AGENA B | EMPTY WEIGHT | 1,400 | AGENA B | EMPTY WEIGHT | 1,400 |
| | LAUNCH WEIGHT | 16,150 | | LAUNCH WEIGHT | 19,800 |
| THOR | EMPTY WEIGHT | 8,830 | ATLAS | EMPTY WEIGHT | 14,150 |
| | LAUNCH WEIGHT | 107,170 | | LAUNCH WEIGHT | 258,130 |
| TOTAL BOOSTER AND AGENA WEIGHT AT LAUNCH | | 123,320 LBS | TOTAL BOOSTER AND AGENA WEIGHT AT LAUNCH | | 277,930 LBS |

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# OUTLINE REQUIREMENTS
## USIB - 6 JULY '60

PHOTOGRAPHIC

- "GENERAL SEARCH" - 20' "RECOGNIZABILITY"
  - 1ST PRIORITY - TO LOCATE SUSPECTED ICBM LAUNCH SITES BETWEEN NOW & END OF 1962
    REPETITIVE SEARCH - ONCE EACH MONTH INITIALLY

E-2 (LIMITED SEARCH CAPABILITY) 1ST FLT - APR '61
E-6 1ST FLT - JAN '62

"DESCRIPTIVE" INFORMATION - 5' "RECOGNIZABILITY"

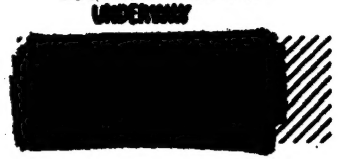
- 2ND PRIORITY - COVERAGE OF HIGHEST PRIORITY TARGET CATEGORY & SUSPICIOUS LOCATION
  LAUNCH & CONTROL OF THESE - MISSION ON SHORT NOTICE

E-6 1ST FLT - SEPT '61

"TECHNICAL CHARACTERISTICS" - BETTER THAN 5' "RECOGNIZABILITY"

- 3RD PRIORITY - HIGH RESOLUTION COVERAGE TO DETERMINE TECHNICAL CHARACTERISTICS OF HIGHEST PRIORITY TARGETS BY THE END OF 1962

ADVANCED RESEARCH UNDERWAY



# SAMOS

- A SATELLITE RECONNAISSANCE SYSTEM IS COMPLEX WITH MANY ADVANCED DEVELOPMENTS REQUIRED, BUT IT CAN BE MADE TO WORK

- DEVELOPMENT PROGRESSION REQUIRED DUE TO PRESENT STATE-OF-THE-ART LIMITATIONS:

  PHOTOGRAPHIC: 20' GROUND RESOLUTION ___/ 3' OR LESS

  ELECTROMAGNETIC: SIMPLE DIGITAL _____/ COMPLEX DIGITAL & ANALOG

  ACTIVE LIFE: 1 WEEK ___/ 4 MONTHS _____/ 1 YEAR

- THE DEVELOPMENT PROGRAM WILL INCLUDE FAILURES IN THE COURSE OF THE DEVELOPMENT EFFORT

# INTELLIGENCE REQUIREMENTS FOR SAMOS

**PRIORITY I**

- [redacted] - LOCATION OF OPERATIONAL ICBM SITES

**PRIORITY II**

A. [redacted] - DESCRIPTIVE INFORMATION ON HIGH PRIORITY TARGET LIST ITEMS

B. [redacted]

**PRIORITY III**

A. [redacted] TECHNICAL CHARACTERISTICS OF HIGH PRIORITY LIST ITEMS

B. [redacted]

**PRIORITY IV**

- [redacted] - TO THE EXTENT DEVELOPMENT PROVES FEASIBLE

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# OUTLINE REQUIREMENTS
## USIB - 6 JULY '60

· PHOTOGRAPHIC

"GENERAL SEARCH" - 20' "RECOGNIZABILITY"

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# OUTLINE REQUIREMENTS

## USIB · 6 JULY 60

**ELINT/COMINT**

LESS PRIORITY AND VALUE THAN PHOTOGRAPHIC RECONNAISSANCE, BUT SHOULD BE CARRIED ON WITH HIGHEST PRIORITY SHORT OF INTERFERING WITH PHOTOGRAPHY

IN VIEW OF THE UNCERTAINTIES OF A FULLY DEVELOPED ELECTRONIC RECONNAISSANCE SYSTEM, THERE IS A RELUCTANCE TO SPECIFY DETAILED REQUIREMENTS FOR THE SHORT TERM

MOST IMPORTANT IS THE SEARCH FOR EMISSIONS ASSOCIATED WITH ANTI-BALLISTIC MISSILE SYSTEMS

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# EXAMPLE OF TARGET THAT MAY BE IDENTIFIED AT DIFFERENT GROUND RESOLUTION

100 ft

CITIES, FORESTS, RAIL ALIGNMENT, INDUSTRIAL COMPLEXES, MAJOR MILITARY INSTALLATIONS, AND LARGE BODIES OF WATER.

COMPONENTS OF MILITARY INSTALLATIONS, AIRBASE RUNWAYS, SUBMARINE BASES, MAJOR SURFACE TO AIR MISSILE SITES, ATOMIC ENERGY INSTALLATIONS, BALLISTIC MISSILE SITES, SURFACED SUBMARINES, LARGE AIRCRAFT AND MISSILE LAUNCHING PADS, IDENTIFICATION OF MAJOR SOVIET NAVAL FORCES.

LARGE AIRCRAFT AND KNOWN MISSILE CARRYING SUBMARINES, LOCATING SPECIAL WEAPONS, ABOVE GROUND ICBM AND IRBM FACILITIES, CAPACITY OF MILITARY STORAGE FACILITIES, IDENTIFICATION OF NAVAL SHIPS BY TYPES.

DETAILED INFORMATION ON MOST MILITARY AND INDUSTRIAL INSTALLATIONS, ALL AIRCRAFT, GROUND FORCES EQUIPMENT AND DISPOSITION, LARGE MISSILES, AAA SITES, STRUCTURAL SHIPBOARD CONFIGURATIONS, LEVELS OF MILITARY ACTIVITY.

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# CHARACTERISTICS
# PHOTO PAYLOAD SYSTEMS

| SYSTEM | DATA RETRIEVAL METHOD | RESOLUTION | SWATH WIDTH | OPERATING LIFE | MAX DAILY COVERAGE MILLION SQ N MI | TOTAL COVERAGE MILLION SQ N MI |
|---|---|---|---|---|---|---|
| E-1 | READOUT | 100′ | 87 N MI | 10 DAYS | .57 (1 STA) | 5.7 |
| E-2 | READOUT | 20′ | 14.5 N MI | 4 MOS | .033 (2 STA) | 4.0 |
| E-5 | RECOVERY | 5′ | 53 N MI | 15-30 DA | 0.6 | 4.9 |
| E-6 | RECOVERY | 8′ | 200 N MI | 5 DA | 3.0 | 14.0 |

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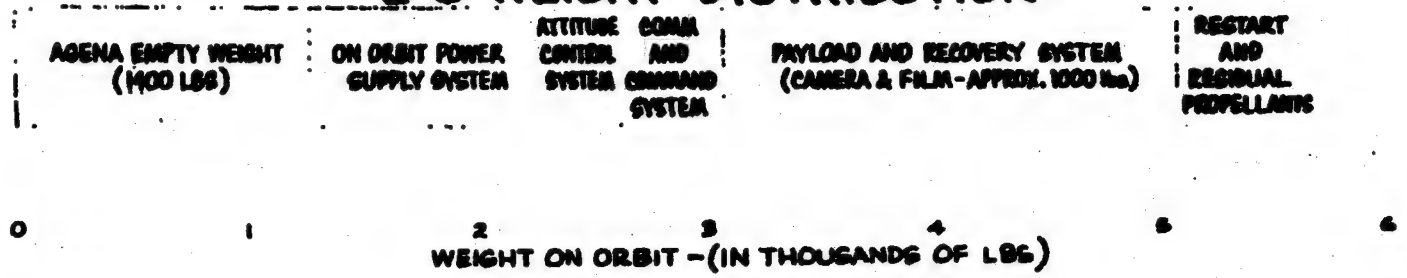
# ORBITAL CAPABILITY

| VEHICLE | WEIGHT ON ORBIT AT 150 N. MILES ALTITUDE: | WEIGHT ON ORBIT AT 261 N. MILES ALTITUDE: |
|---|---|---|
| THOR & AGENA B | 2800 LBS | 2600 LBS |
| ATLAS & AGENA B | 6500 LBS | 6200 LBS |

| SYSTEM | WEIGHT ON ORBIT AT 150 N. MILES ALTITUDE: | WEIGHT ON ORBIT AT 261 N. MILES ALTITUDE: |
|---|---|---|
| E-5 | 5700 LBS | |
| E-1 / F-1 | | 4300 LBS |
| F-2 | | 4100 LBS |
| F-3 | | 4400 LBS |
| E-2 | | 4900 LBS |

## E-5 WEIGHT DISTRIBUTION



# VISUAL SENSORS CAPABILITIES

| E-1 COMPONENT TEST PAYLOAD | E-2 | E-5 | E-6 |
|---|---|---|---|
| TERRAIN FEATURES & COMMUNICATION CENTERS | IDENTIFY FEATURES & COMPLEXES | LEVEL OF MILITARY ACTIVITY | IDENTIFY FEATURES & COMPLEXES |
| AIRFIELDS | LARGE AIRCRAFT | IDENTIFY AIRCRAFT | LARGE AIRCRAFT |
| HARBOR FACILITIES & SHIPPING | SUBS-PIERS-SUPPORTING FACILITIES | IDENTIFY TYPES & USES ie. SHIPBOARD MISSILE FACILITIES | SUBS-PIERS SUPPORTING FACILITIES |
| LOCATE INDUSTRIAL COMPLEXES | IDENTIFY INSTALLATIONS | IDENTIFY MATERIAL PRODUCTION | IDENTIFY INSTALLATIONS |
| SUSPECT CONSTRUCTION OF MISSILE SITES | LOCATE MISSILE SITES | IDENTIFY TYPE OF MISSILE SITE | LOCATE MISSILE SITES |
| FIRST FLIGHT - SEP 60<br>3 FLIGHTS<br>STRIP CAMERA<br>6" FOCAL LENGTH | FIRST FLIGHT - APR. 61<br>3 FLIGHTS<br>STRIP CAMERA<br>36" FOCAL LENGTH | FIRST FLIGHT - SEPT 61<br>7 FLIGHTS<br>PANORAMIC CAMERA<br>66" FOCAL LENGTH | FIRST FLIGHT - JAN 62<br>7 FLIGHTS<br>PROBABLY A PANORAMIC CAMERA<br>24" TO 36" FOCAL LENGTH |

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# FERRET SENSORS CAPABILITY

| F-1 | F-2 | F-3 |
|---|---|---|
| RECOGNITION OF CONVENTIONAL GROUND, NAVAL & AIRBORNE RADAR SIGNALS | RECOGNITION OF KNOWN AND SUSPECTED SIGNALS | "FINE" LOOKS AT SIGNALS DISCOVERED BY GENERAL COVERAGE SYSTEM |
| LOCATION WITHIN 150 N.M. CIRCLE | IMPROVED LOCATION ACCURACY | "LOOKS" AT GIVEN SIGNALS FROM HORIZON-TO-HORIZON |
| FREQUENCY COVERAGE OF S AND X BAND | FREQUENCY COVERAGE FROM 59 TO 18,000 MC/S | FREQUENCY COVERAGE SAME AS GENERAL COVERAGE SYSTEM |
| ONETIME COVERAGE OF 60% -70% OF SOVIET BLOC | COVERAGE OF ENTIRE SOVIET BLOC EVERY FIVE DAYS | WIDE BAND WIDTH (6 MC/S) RECORDING OF ALL SIGNALS |
| 1ST FLIGHT SEPT. 60 -3 FLTS. (IN COMBINATION WITH E-1) | 1ST FLT. JUNE-61 2 FLTS. | 1ST FLIGHT WILL BE SCHEDULED |

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# SAMOS OUTPUTS

READOUT

READOUT TIME { VAFB STA ONLY - 25 MIN PER DAY
VAFB & NEW BOSTON STA - 53 MIN PER DAY

PHOTO E-2 (20') · PER MINUTE OF READOUT - 800 SQ MILES 90 FT OF 35 M PRIMARY RECORD = 12 - 9½" X 18" PHOTOS

ELINT F-2 (DIGITAL) 10,000 INTERCEPTS

RECOVERY

PHOTO E-5 (5') PER MISSION - 4.9 MILLION SQ N MI

E-6 (8') PER MISSION - 9.0 MILLION SQ N MI

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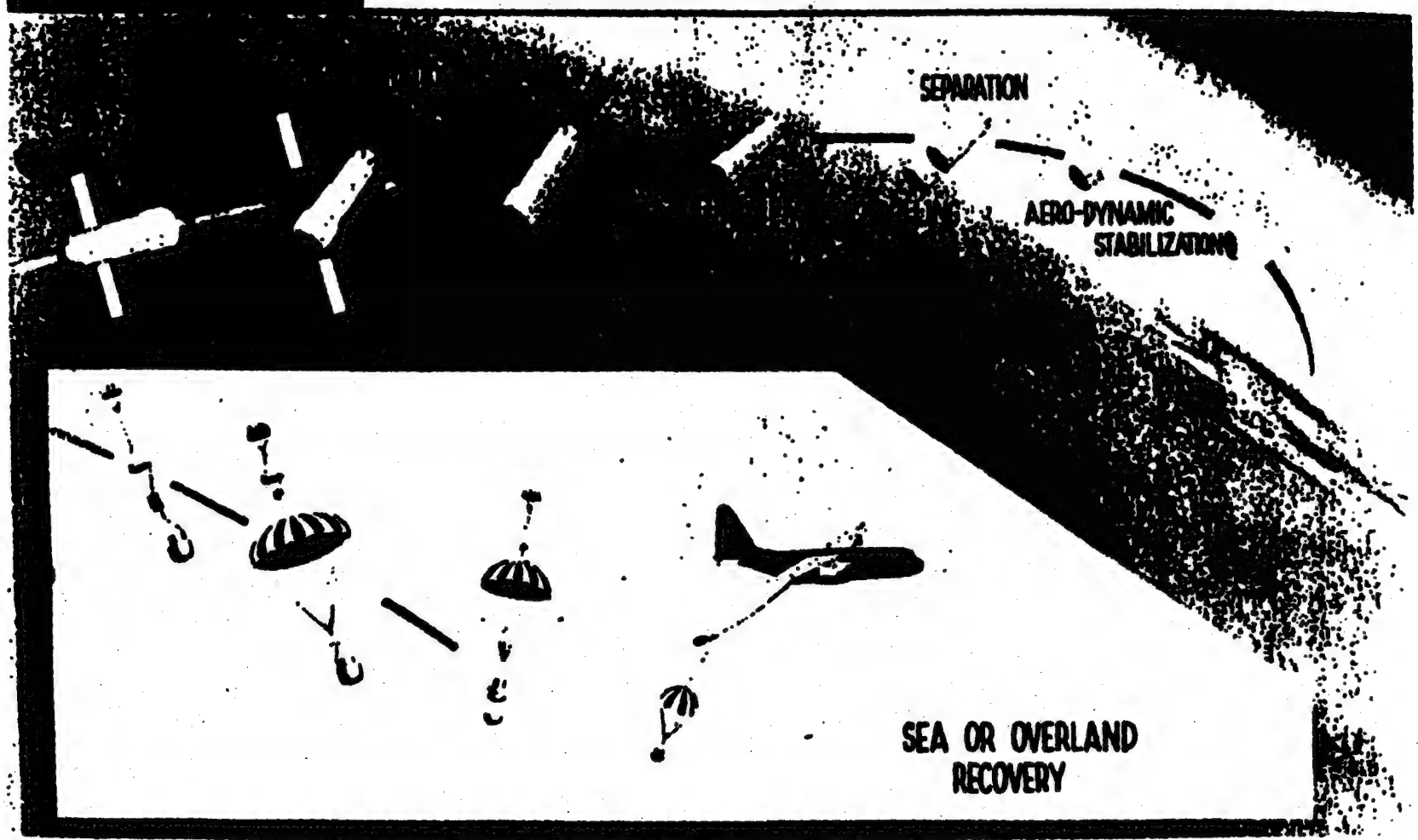
# SAMOS E5 RECOVERY SEQUENCE

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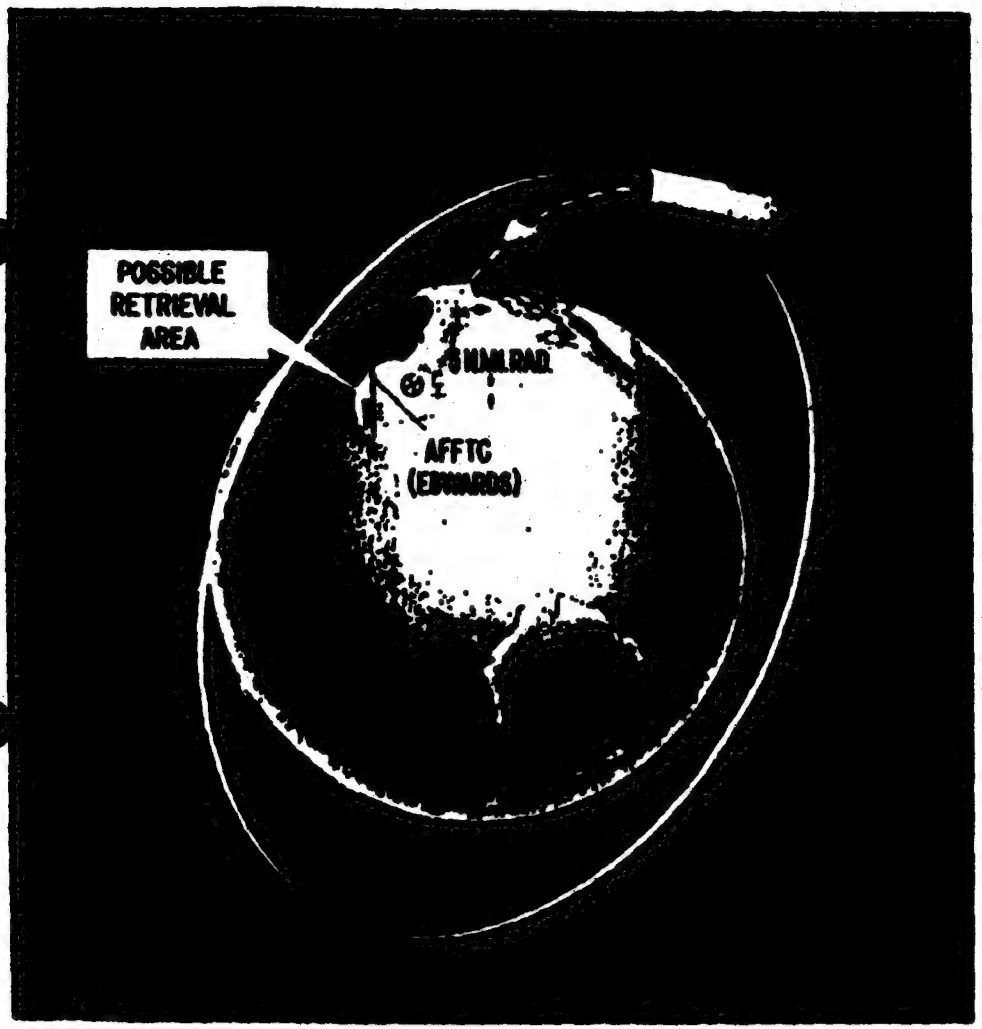
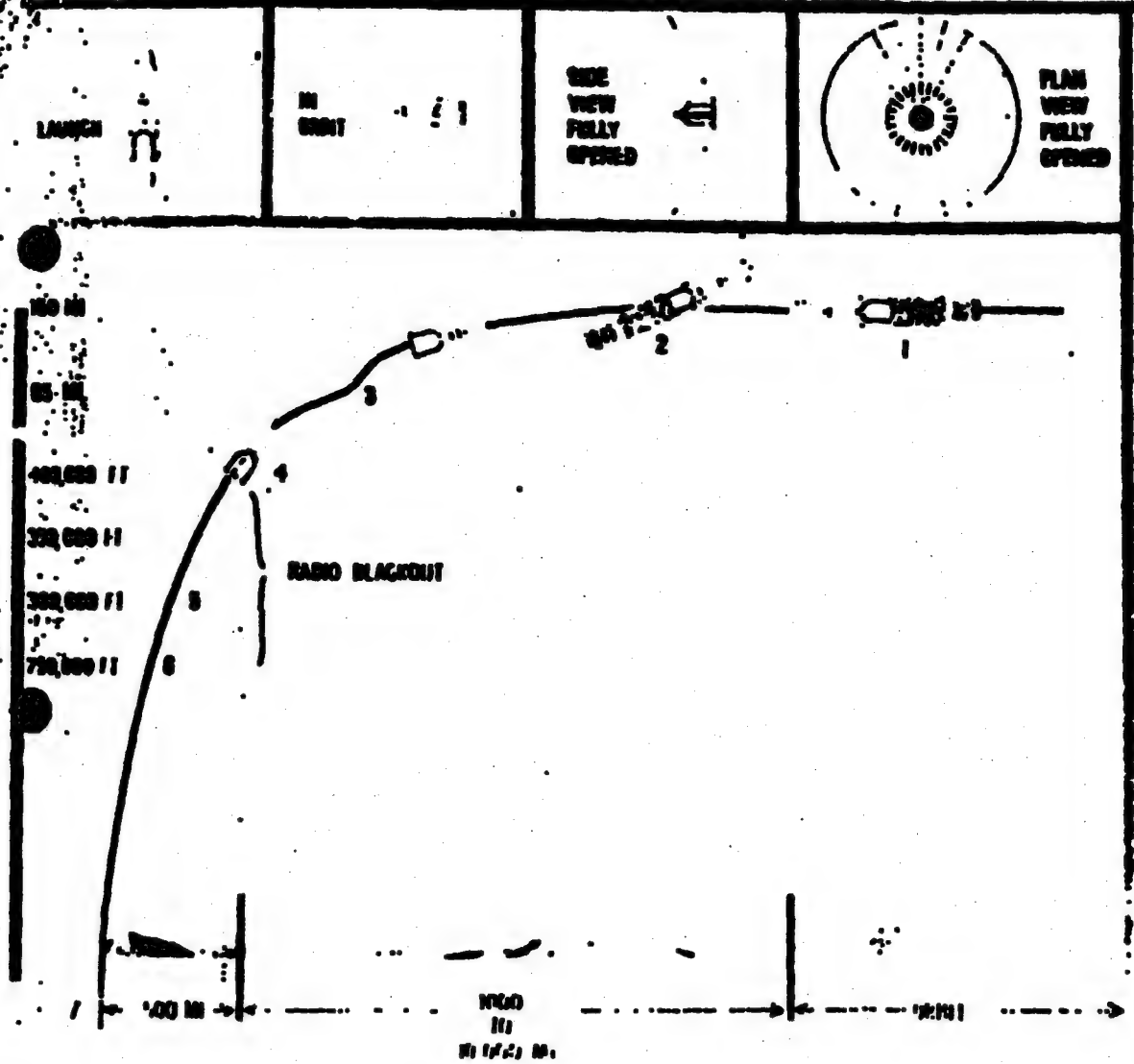
# SAMOS E-6 — A NEW APPROACH




- RELIABILITY (SHORT LIFE)
- LARGE AREA COVERAGE
- HIGH RESOLUTION
- EARLY CAPABILITY
- PRECISE OVERLAND RETRIEVAL
- BROADENED CONTRACTOR BASE
- COMPATIBLE WITH DATA PROCESSING EQUIPMENT
- UTILIZE EXISTING GROUND FACILITIES

# SAMOS E-6 – DRAG BRAKE RE-ENTRY SEQUENCE




1 VEHICLE IN ORBIT

2 REORIENTATION, RETRO FIRING & SEPARATION

3 MODULATE FOR RANGE CORRECTION

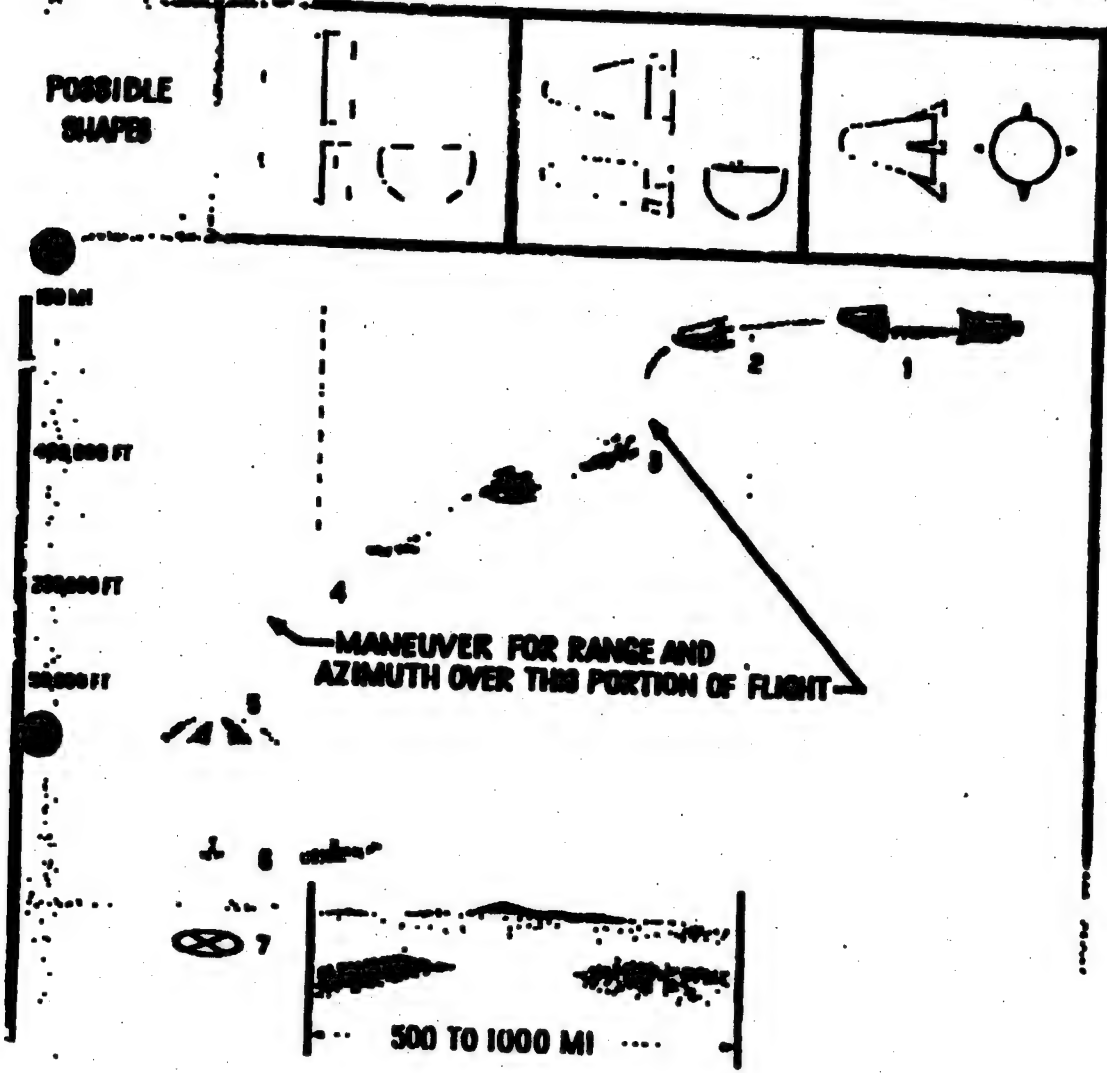
4 FULL OPEN

5 PEAK HEATING

6 PEAK DECELERATION

7 LANDING - 40 F.P.S.

# SAMOS E-6 - TYPICAL LIFT RE-ENTRY SEQUENCE




1 VEHICLE IN ORBIT

2 RETRO-ROCKET FIRING AND SEPARATION

3 RE-ENTRY AND RADIO BLACK-OUT-START RANGE AND AZIMUTH CORRECTIONS

4 POST-BLACKOUT-MACH 15 COMMUNICATE FOR TERMINAL GUIDANCE

5 PARACHUTE OPEN-MACH 0.6 TO 1.0

6 AIR PICKUP ATTEMPT POSSIBLE

7 IMPACT - 25 F.P.S.

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# INTERIM READOUT R&D DATA FLOW

SECURITY CONTROLLED
WITHIN R&D FACILITIES

[redacted]

35 MM PRIMARY RECORD
AND FERRET MAGNETIC TAPE

VIA ARMED FORCES OR SPECIAL COURIER

[redacted]

T&A
STATIONS
[illegible]

TRACKING DATA VIA 100 W/M TT

STC
SUNNYVALE, CALIF

COMMAND & CONTROL

DATA PROCESSING

EPHEMERIS

FEEDBACK

[redacted]

PHOTO-RECONSTRUCTED & TITLED TRANSPARENCIES & PRIMARY RECORDS (SINGLE MASTERS FOR SUBSEQUENT DUPLICATION)

FILM PROCESSING ORGANIZATION "DUPLICATING"

REPRODUCTIONS AS REQUESTED & DISTRIBUTION TO USERS

FERRET TABULAR PRINTOUT OF INTERCEPTS

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# SUMMARY

## ELEMENTS OF SAMOS RESEARCH AND DEVELOPMENT PROGRAM

- RECOVERY
  - E-5 PHOTO 5' RESOLUTION - 7
  - E-6 PHOTO 8' RESOLUTION - 7
  - DIAGNOSTIC RECOVERY - 4
- READOUT
  - COMPONENT TESTS PHOTO-ELINT E-1/F-1 3
  - E-2 PHOTO 20' RESOLUTION - 2
  - F-2 ELINT DIGITAL - 1

  24 PLUS 5 UNASSIGNED
- SPECIAL COMPONENT TESTS — ATLAS/AGENA(THRU 1962)
- LAUNCHINGS FROM PT. ARGUELLO
- TRACKING STATIONS
  - VANDENBERG AND NEW BOSTON, INCL. READOUT
  - HAWAII AND ALASKA VHF ONLY
- CONTROL - SATELLITE TEST CENTER - SUNNYVALE
- DATA PROCESSING
  - DEVELOPMENT LABORATORY - DENVER
  - INTERIM PROCESSING OF R&D TAKE - SUNNYVALE
- RECOVERY CENTER - HAWAII

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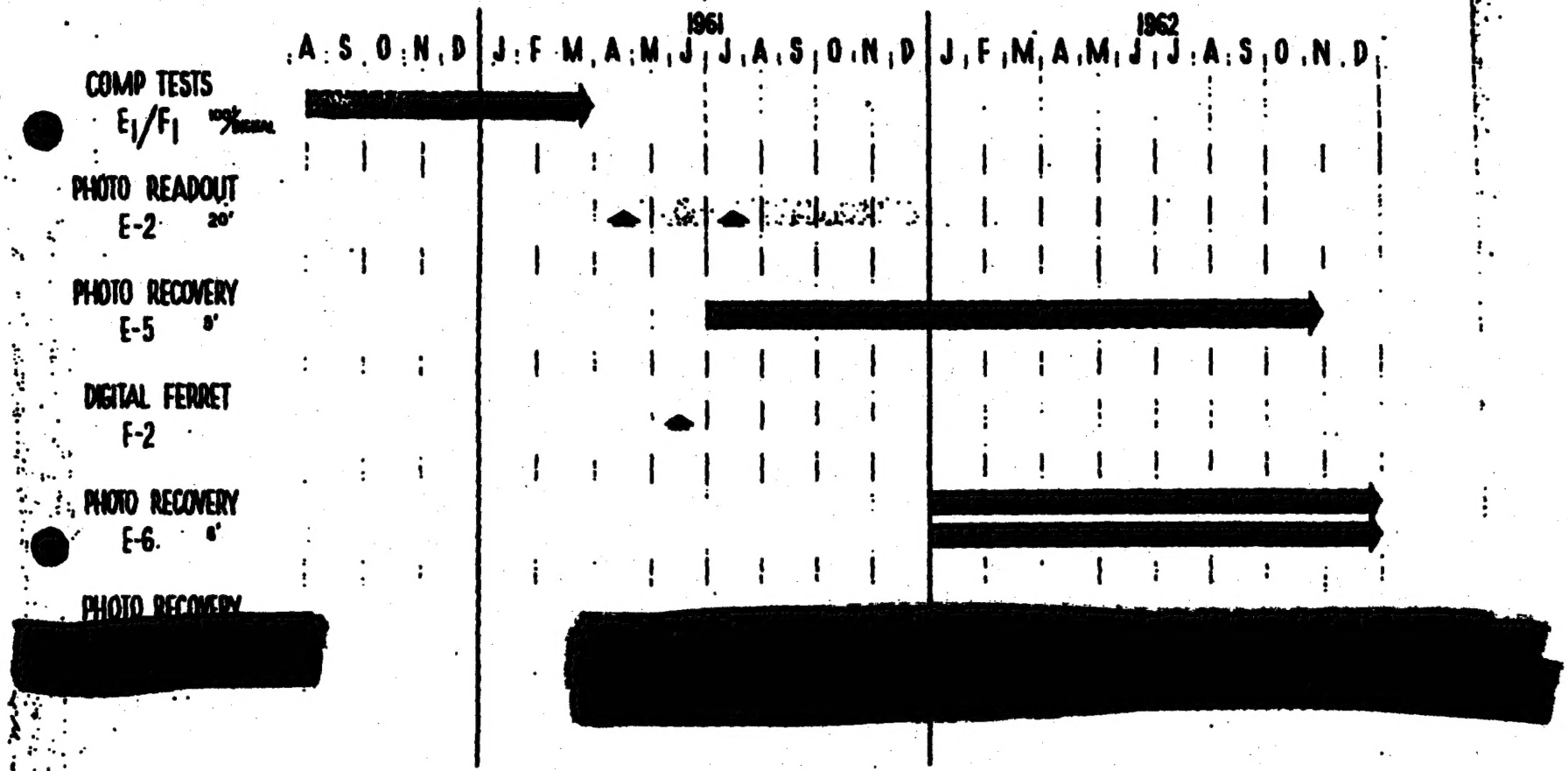
# ~~SAMOS~~ LAUNCH SCHEDULE

~~11 AUG 60 DEV PLAN~~

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● DIAGNOSTIC FLIGHTS

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# SAMOS FUNDING STATUS [redacted]

| | FY 1961 FUNDING REQUIREMENTS |
|---|---|
| REALIGNMENT OF PRESENT PROGRAM. | |
| TECHNICAL DIRECTION AND SYSTEM INTEGRATION FOR PRESENT PROGRAM. | |
| TOTAL PRESENT PROGRAM FOR FY 1961. | |
| NEW RECOVERY PROGRAM. | |
| ADDITIONAL BACK-UP TECHNICAL EFFORT. | |
| ADDITIONAL BOOSTERS & AGENAS FOR FLEXIBILITY. | |
| AGENA GROUND SUPPORT EQUIPMENT FOR NEW STANDS. | |
| TOTAL ADDITIONAL PROGRAM | |
| **TOTAL REVISED FY 61 SAMOS PROGRAM** | [redacted] |

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